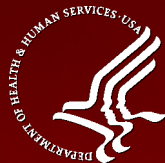


State of The Art Management of POSTTRANSPLANT SEQUELAE

FOR PHYSICIANS,
NURSES, AND PHARMACISTS

PRESENTED BY:



NATIONAL INSTITUTE OF ALLERGY AND INFECTIOUS DISEASES OF
THE NATIONAL INSTITUTES OF HEALTH
U S DEPARTMENT OF HEALTH AND HUMAN SERVICES

Therapeutic Compliance Posttransplantation— A Nurse's Perspective

THIRD IN A SERIES OF MONOGRAPHS

**BASED ON A ROUNDTABLE
HELD JANUARY 28, 2005,
IN BETHESDA, MARYLAND**

IN COOPERATION WITH:



AMERICAN SOCIETY OF
TRANSPLANT SURGEONS



UNITED NETWORK
FOR ORGAN SHARING



NORTH AMERICAN TRANSPLANT
COORDINATORS ORGANIZATION



INTERNATIONAL TRANSPLANT
NURSES SOCIETY

JOINTLY SPONSORED BY:

UNIVERSITY
OF MINNESOTA



SUPPORTED BY:

THIS PROGRAM IS SUPPORTED BY
AN EDUCATIONAL GRANT FROM WYETH.

Wyeth



Accreditation

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) and the Criteria for Quality of the Accreditation Council for Pharmacy Education (ACPE) through the joint sponsorship of the University of Minnesota Office of Continuing Medical Education, University of Minnesota Office of Continuing Pharmacy Education, and SynerMed® Communications.

CME-Accredited Sponsor

The University of Minnesota is accredited by the ACCME to provide continuing medical education for physicians (Provider Number 0000810).

CPE Accreditation



The University of Minnesota College of Pharmacy is accredited by the Accreditation Council for Pharmacy Education (ACPE) as a provider of continuing pharmacy education. The Universal Program Number is 031-999-05-080-H01. Following completion of the program, successful passing of the posttest (70% or better) and submission of a program evaluation, statements of credit will be mailed to participants within 4 weeks of receipt of materials.

Credit Designation Statement

Physicians—The University of Minnesota designates this educational activity for a maximum of 1.0 category 1 credit toward the AMA Physician's Recognition Award. Each physician should claim only those credits that he/she actually spent in the educational activity.

Nurses—This program was designed to meet Minnesota Board of Nursing continuing education requirements and provides 1.2 contact hours of continuing education.

Pharmacists—The University of Minnesota approves this educational activity for 1.0 contact hour of pharmacy continuing education credit.

Financial Support

This program is supported by an educational grant from Wyeth.

Educational Objectives

At the conclusion of this program, participants will be able to:

- Discuss the current definitions of and alternative terminology for compliance
- Understand the wide range of studies devoted to characterizing compliant and noncompliant transplant recipients
- Evaluate the short- and long-term impact of noncompliance on the transplanted organ and transplant recipient
- Describe approaches to determine compliance
- Evaluate strategies and interventions to address compliance issues

Target Audience

Transplant surgeons, transplant nephrologists, transplant nurses, transplant coordinators, pharmacists, and other healthcare professionals who are involved in the treatment and management of renal transplant recipients.

Term of Approval

Date of Original Release: August 2005

Expiration Date: August 31, 2006

Faculty Disclosure Information

The University of Minnesota endorses the standards of the Accreditation Council for Continuing Medical Education, the Accreditation Council for Pharmacy Education, and the guidelines of the Association of American Medical Colleges that the sponsors of continuing medical education activities and the speakers at these activities disclose significant relationships with commercial companies whose products or services are discussed in educational presentations. For speakers, significant relationships include receiving from a commercial company research grants, consultancies, honoraria and travel, or other benefits or having a self-managed equity interest in a company. Disclosure of a relationship is not intended to suggest or condone bias in any presentation, but is made to provide participants with information that might be of potential importance to their evaluation of a presentation.

Affiliation/Financial Interest			
Faculty Member	Grants/Research Support	Consultant	Speakers Bureau
J. J. Curtis, MD	No affiliation or financial interest		
O. Gaber, MD	Fujisawa Healthcare, Inc; Genzyme Corporation; Novartis; Roche Laboratories Inc; Wyeth-Ayerst Laboratories		Wyeth-Ayerst Laboratories
B. L. Kasiske, MD	Bristol-Myers Squibb; Merck & Co, Inc; Pfizer Inc		Amgen; Fujisawa Healthcare Inc; Merck & Co, Inc; Novartis; Pfizer Inc; Roche Laboratories Inc; Wyeth-Ayerst Laboratories
R. H. Rubin, MD		Merck & Co, Inc; Merrimack; Pfizer Inc; Roche Laboratories Inc	
R. P. Winsett, PhD	No affiliation or financial interest		
E. S. Woodle, MD	Enzon, Inc; Fujisawa Healthcare, Inc; Genzyme Corporation; Roche Laboratories Inc; Wyeth-Ayerst Laboratories		

Therapeutic Compliance Posttransplantation— A Nurse's Perspective

Presented by

National Institute of Allergy and Infectious Diseases
National Institutes of Health
Division of Allergy, Immunology, and Transplantation
Bethesda, Maryland

Represented by

Shiv A. Prasad, PhD

Chief, Transplantation Immunobiology Branch
National Institute of Allergy and Infectious Diseases
National Institutes of Health
Bethesda, Maryland

Program Chair

Bertram L. Kasiske, MD

Professor of Medicine
University of Minnesota
Minneapolis, Minnesota

Faculty

John J. Curtis, MD

Professor of Transplant Nephrology
Professor of Surgery, Division of Transplantation
University of Alabama at Birmingham
Birmingham, Alabama

Osama Gaber, MD

Professor, Department of Surgery
Associate Professor, College of Nursing
University of Tennessee Health Science Center
Memphis, Tennessee

Robert H. Rubin, MD

Osborne Professor of Health Sciences and Technology
Professor of Medicine, Harvard Medical School
Associate Director, Division of Infectious Disease
Brigham and Women's Hospital
Director, Center for Experimental Pharmacology and Therapeutics,
Harvard University-Massachusetts Institute of Technology
Division of Health Sciences and Technology
Boston, Massachusetts

E. Steve Woodle, MD

Professor of Surgery
Director, Division of Transplantation
Chairman, Board of Directors
Israel Penn International Transplant Tumor Registry
Department of Surgery
University of Cincinnati College of Medicine
Cincinnati, Ohio

Rebecca P. Winsett, PhD

Associate Professor, College of Nursing
University of Tennessee Health Science Center
Memphis, Tennessee

TABLE OF CONTENTS

PAGE

Introduction	1
Compliance as a Complex Debated Concept	2
Conceptual issues on compliance.	2
Compliance concepts in transplantation	2
Research Studies for Measurements and Predictions of Compliance	3
Compliance studies in kidney transplantation	3
Compliance studies in heart transplantation	5
Clinicians' perception of compliance	6
Strategies for prevention or prophylaxis of noncompliance	6
Conclusions	8
References	8
Posttest	9
Program Evaluation	10

INTRODUCTION

Although compliance has been more formally studied since the 1950s,¹ Hippocrates in the 5th century BC pro- saically asserted that whereas physicians need to do their part in patient care, patients and caregivers must actively participate as well.² Currently, “compliance” is the term most frequently used both in the medical literature and in daily conversation to refer to a set of patient behaviors that Haynes (Haynes 1978) generally defined as “the extent to which a person’s behavior (taking medications, following a recommended diet or executing life-style changes) coincides with medical or health advice.”¹ Not only are the term “compliance” and its definition inconsistent and debated through the medical literature, but its converse, the term “noncompliance,” is an equally divisive issue problematic to many healthcare professionals.^{3,4} Additionally perplexing is that compliance is sometimes used to refer to either the positive adherence to treatment plans or the lack of adherence to the plans.⁴

Many nurses have sought a patient-centered approach to the issue of compliance that supports nurses’ learning about the impact of medical treatments on patients’ lives, not solely on their health. This approach focuses on fitting healthcare needs into a patient’s beliefs, life situation, and circumstances and moves the power and authority more to the patient than to the healthcare professional.⁵ Therefore, nurses have gradually refined a definition of compliance that is more suitable to their views. The North American Nursing Diagnosis Association (NANDA) defined noncompliance in 1996 as “the extent to which a person’s and/or caregiver’s behavior coincides with a health promoting or therapeutic plan agreed upon by the person (and or family or community) and health care professionals.” However, many of the nursing participants remained displeased with the continued use of the term compliance.⁴

Alternatives to the term “compliance” have been suggested as options that have less negative connotations⁵ and are even considered by some authors as more accurate for specific studies. Therefore, in the literature synonyms such as adherence, cooperation, mutuality, and therapeutic alliance are used. However, these terms are equally ill defined in individual studies and inconsistent as to specific phenomena under discussion.¹ So the difficulty of comparing compliance studies and interventions is initially complicated by the lack of an accepted definition.^{1,6}

The numerous measures of compliance can also be confusing because all methods, including direct assessment such as measurement of drug blood levels and pill-counting devices, can be circumvented. The popular patient questionnaires and/or self-assessments rely on the accuracy or reliability of the patient or an observer and can be subject to intentional or

unintentional inaccuracies.^{1,7} Adding to the complexity are situations in which only one component of a multi-component regimen is assessed for compliance, yet compliance with the other components may affect the measure of interest.¹ More fundamentally, the exact point at which a behavior is defined as noncompliant is not always clear. With a range of more than 200 variables once identified as potentially contributing to noncompliance, measurements of compliance can be dauntingly complicated.⁵ Regardless of the conceptual issues about compliance, dedicated research has provided important relationships between the compliance issue under study and patient outcomes.^{8,9}

In solid organ transplantation, compliance especially with immunosuppressive medications is a critical issue because the outcomes of noncompliance are quite devastating. Noncompliance in transplant recipients is associated with late acute rejection,⁹ graft loss,^{9,11} and, in some cases, unnecessary mortality.^{6,11}

Not only is noncompliance detrimental to transplant recipient morbidity and survival, but, with the limited availability of donor organs, the decision about which patients should receive an organ or be retransplanted if their graft is lost because of a history of noncompliance is highly discussed.³ However, many clinicians believe that compliance should not be the sole determinant for access to transplantation if the causes of noncompliance are treatable.^{6,12,13}

Numerous studies have addressed the issue of compliance in solid organ transplantation by measuring the extent of compliance and attempting to ascertain which patient or environmental factors encourage or undermine compliance. The extent of noncompliance with immunosuppressant therapy varies considerably among studies, as definitions and measures differ, and ranges between 5% and 70% have been reported.¹³ A meta-analysis based on a systematic review of the literature in renal transplantation revealed that noncompliance is common and contributes significantly to graft loss with the odds of graft failure increased 7-fold in noncompliant compared to compliant patients ($P < .001$).⁸ However, grafts can be lost to many causes other than noncompliance: Didlake and colleagues reported noncompliance as the third leading cause of kidney allograft loss.^{2,14} In their 5-year study of renal transplant recipients, 49.2% of grafts were lost to rejection, 16.6% to systemic infection, 11.9% to noncompliance, 6.3% to thrombosis, and the remainder to technical reasons, primary nonfunction, recurrent disease, and miscellaneous.²

The ultimate goals of many of the compliance studies beyond determining the seriousness of the problem are to identify patients at risk for noncompliance and develop

prophylactic strategies or interventions to resolve the potential or existing noncompliance. Since it is common that most transplant recipients take more than 8 drugs per day at multiple specific times,⁷ have clinic appointments once weekly for approximately 1 year posttransplantation, provide urine and blood samples during and between clinic visits, and are expected to comply with healthy diet and lifestyle behaviors, compliance with these demands may be overwhelming or objectionable to many patients.¹⁵ Much of the strategy in transplantation involves simplifying complex regimens and increasing patient education, but success of these approaches for individual patients is not guaranteed.¹⁰

Although progress has been made in recognizing compliance as a determinant in clinical outcomes in transplantation, the methods of measuring compliance, identifying potentially noncompliant patients, diagnosing noncompliance, and designing strategies to overcome compliance barriers continue as active research and clinical problems for individual patients and healthcare professionals.

COMPLIANCE AS A COMPLEX DEBATED CONCEPT

Conceptual issues on compliance

There are three major philosophical approaches to the study of compliance as a concept and, thus, are responsible for the objective designs of studies: logical positivism, naturalistic, and critical or emancipatory. The logical positivism (logical empiricism) approach is based on reality and formal logic to explain the universe and involves logical analysis of scientific knowledge by identifying patterns. The types of studies seen in this approach are descriptive ones, which allow a theory to be built based on personal characteristics and regression analyses for predictive power. This approach believes that compliance is a measurable concept. The naturalistic approach is to explain and describe in order to diagnose, understand, and formulate meaning. The types of studies with this approach are qualitative, with probes of participants for the meaning of actions/occurrences and other forms of “storytelling.” This approach looks for the meaning of events. The critical or emancipatory approach addresses how sociopolitical and cultural factors influence experience. The types of studies seen with this approach include analyses of cultural characteristics, such as race, or how the dynamics of structures, such as family or the law, effect change. This approach studies the forces that impact compliance. Although studies and, thus, conclusions using all of these approaches are evident in the transplant literature, overall the literature points to the belief that compliance should be measurable and predictable.¹⁶

There is still debate over how nurses view and use the term “compliance” because in the literature three basic categories of thought have been designated. The first category is evaluative, in which the authors do not believe the concept of compliance is consistent with the goals of nursing because it carries overtones of paternalism and acquiescence. This group is concerned with labeling of patients as “difficult.” The second category is rationalization, in which the term “compliance” is disliked, but compliance (or a synonym) or no actual terms are used to refer to compliance. For this group, studies are pursued because of the importance of the issue. The third category is acceptance, in which compliance is accepted as a critical issue for nursing intervention. When evaluating publications and conclusions from the medical literature on compliance, nurses should understand the category of thought within the article.^{1,4,5}

Compliance concepts in transplantation

Noncompliance has been described as a syndrome in transplantation that is classifiable using four discrete facets of behavior: timing, frequency, origin, and diagnostic certainty (Table 1).³ Noncompliance was specifically defined as “covert nonadherence to prescribed medication used for the prophylaxis of allograft rejection and threatening impaired kidney histology or function.”³ This definition applies the specifics of transplantation to the general compliance definitions offered by Haynes¹ and the NANDA.⁴ It focuses noncompliant behavior on the act of not taking the medications that alter the graft outcomes of allograft rejection, graft loss, and patient mortality.³ Additional profiles of noncompliant renal transplant recipients were developed by Siegal and Greenstein¹⁷ for nurses to better recognize behaviors in their patients and tailor interventions. These profiles were based on the patients’ beliefs about the efficacy of their immunosuppression and include accidental noncompliers who sometimes forget to take medication, invulnerable noncompliers who believe that they do not need to take medication regularly, and

Table 1
Classification of Noncompliance* After Transplantation

Timing	Frequency	Origin	Diagnostic Certainty
Early	Occasional	Accidental	Definite
Late	Intermittent	Invulnerable	Probable
Continous	Persistent	Decisive	Possible
	Complete		Unlikely

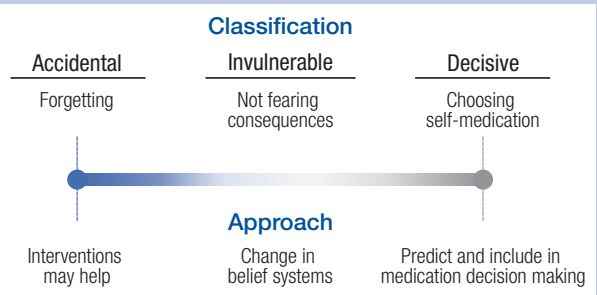
*Noncompliance = covert nonadherence to prescribed medication used for the prophylaxis of allograft rejection and threatening impaired kidney histology or function.

Adapted with permission from Chapman JR. *Transplantation*. 2004;77:782-786.³

decisive noncompliers who make independent decisions about adhering to their immunosuppressive regimen (Table 1 and Figures 1 and 2).^{3,17}

Within the literature, however, the exact point at which a patient becomes noncompliant is not always clear, so questions remain about cutoffs for compliance, similarities or differences in outcomes based on the cutoffs, and whether the same interventions can be applied for the different noncompliant behaviors. Applying the compliance concepts to behaviors leads to a compliance continuum to consider when developing strategies or approaching patients (Figure 1).^{3,17}

Figure 1
Compliance Continuum^{3,17}



RESEARCH STUDIES FOR MEASUREMENTS AND PREDICTIONS OF COMPLIANCE

Chapman asserts that although there are a number of methods that can lead to the diagnosis of noncompliance, the most critical and certain diagnosis comes from patient admission of noncompliance to prescribed immunosuppression (Table 2).³ Interestingly, there is some thought that patients are more willing to disclose noncompliance to independent researchers rather than their healthcare staff.¹⁸ Chisholm further critiqued the available methodology through reviewing studies (from 1988 through 2001)

Table 2
Methods of Establishing the Diagnosis of Noncompliance With Most Certain Being Patient Admission

- 1. Patient admission
- 2. Therapeutic drug monitoring of blood levels
- 3. Pharmaceutical monitoring: electronic pill counting or pharmacy dispensing/package return monitoring
- 4. Event related (eg, allograft rejection)
- 5. Physical examination (eg, lack of Cushingoid appearance)
- 6. Third-party observation by parents, friends, siblings, spouse, or children

Adapted with permission from Chapman JR. *Transplantation*. 2004;77:782-786.³

that include solid organ transplantation (primarily kidney) and discuss immunosuppressive medication adherence and factors influencing the adherence. Advantages and disadvantages of methods still in current use show that no method is without drawbacks (Table 3).⁷

In addition to the complexities of compliance methodology, the patient characteristics or social/environmental factors to evaluate in any study include an enormous array of possibilities from patient-related, transplant unit- or health-care professional-related, medication-related, and caregiver-related factors.^{3,19} Individual studies have focused on selected set of variables in solid organ transplantation.

Compliance studies in kidney transplantation

In a series of studies in renal transplantation, multicenter patient surveys were used to assess a number of risk factors for compliance. Of 2500 patients contacted from the 56 participating centers, 1402 met eligibility requirements for inclusion. A noncompliance rate of 22.4% was found, with increasing age associated with better medication compliance and longer time from transplantation associated

Table 3
Advantages and Disadvantages of Commonly Used Methods for Compliance Determination

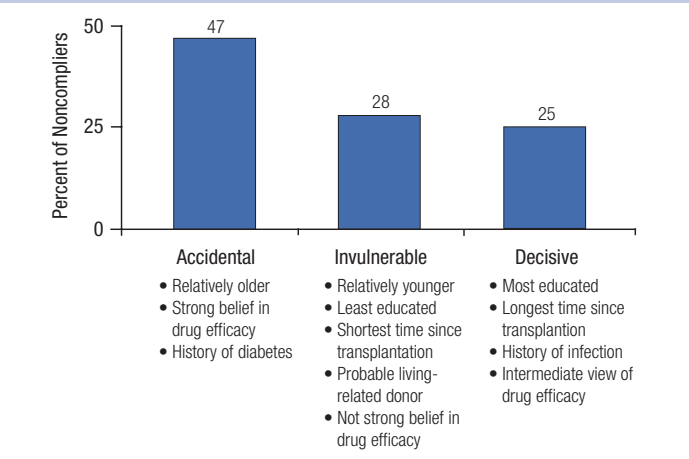
Method	Advantages	Disadvantages
Blood concentration monitoring	<ul style="list-style-type: none">Provides an objective measure and is usually quantitative	<ul style="list-style-type: none">Expensive and inconvenient to patientLimited range of drugs available for monitoringPossibility of laboratory error or timing of blood samplePatient may increase compliance prior to blood draw
Electronic monitoring devices	<ul style="list-style-type: none">Provides an objective measure of quantity dispensed	<ul style="list-style-type: none">ExpensiveAssumes only one source of medication supplyAssumes medication dispensed was consumed
Patient interview direct questioning	<ul style="list-style-type: none">InexpensiveImmediate feedback	<ul style="list-style-type: none">Depends on memory and honesty of patientDepends on skills of interviewer
Pill count	<ul style="list-style-type: none">Provides objective measure of quantity taken	<ul style="list-style-type: none">Time consumingAssumes medication not in container was consumed
Refill record	<ul style="list-style-type: none">Provides an objective measure of quantity of medication obtained	<ul style="list-style-type: none">Assumes only one source of medication
Urine assay for measure of drug metabolites or marker compound	<ul style="list-style-type: none">Objective measure	<ul style="list-style-type: none">Usually a qualitative indication of drug consumptionDepends on reliability of assayPatient may increase compliance prior to urinalysis

Adapted with permission from Chisholm MA. *Drugs*. 2002;62:567-575.⁷

with the likelihood of noncompliance.²⁰ Further multivariate and cluster analysis of these data based on patients' beliefs by Siegal and Greenstein resulted in profiles of noncompliers (Figure 2).¹⁷ These profiles were developed to provide cues to transplant nurses for recognition of potentially noncompliant patients and perhaps to differentiate ways to intercede with the patients.¹⁷ In a subsequent large-scale study, the reliability and validity of the Life Satisfaction Index (LSI), a transplantation-specific health-related quality-of-life survey, were evaluated from mailed questionnaires to 3675 renal transplant recipients. The incidence of self-reported noncompliance ranged dramatically from 2% to 57% depending on how the question was posed and responses of "rarely," "sometimes," "often," or "always" were combined to determine prevalence. Forgetfulness (56.9%) and alternating the drug dose or schedule (41.6%) were the most significantly prevalent forms of noncompliance and were negatively associated with LSI ($P<.05$).²¹

A recent publication compared compliance data using distinct forms of continuous measurements, including patient self-reports, cyclosporine levels, and electronic monitoring (for prednisolone), and categoric measures, including clinician rating, interviewer rating, self-reports, and questionnaires. Nonadherence was defined for each type of measure, and the sensitivity and specificity of each measure were determined in comparison to electronic monitoring, which was considered the best measure of adherence for research purposes. Since few patients in the study were identified as noncompliant through electronic monitoring, investigators noted that the sensitivity and specificity determinations should be interpreted cautiously, but cyclosporine levels and clinician rating measures did not compare favorably with electronic monitoring. Also in comparison to electronic monitoring, interviews by nonclinicians most accurately measured noncompliance, but with only a positive predictive value of 60%.¹⁸ Further assessments of the patient group ($n=58$) tried to identify modifiable risk factors associated with noncompliance using electronic monitoring and health-belief questionnaires and measurement of functional status and depression. Of the sociodemographic, transplantation-related, and psychosocial variables assessed (Table 4),¹² only lower belief in medication need and live-donor transplanted kidney were associated with noncompliance (defined as missing at least 20% of days on prednisolone). Although depression was common (22% of patients), it was not strongly associated with noncompliance.¹²

Figure 2
Profiles of Noncompliant Renal Transplant Recipients¹⁷



In a study that was limited to primarily adult Caucasian participants and self-report measures of compliance, questionnaires from 241 patients with a functioning graft supported analysis of 3 groups of risk factors for (1) medication or (2) follow-up noncompliance: demographic, transplant related, and psychosocial. Regression analysis showed that transplant-related stress was the strongest predictor of both medication and follow-up noncompliance. Unlike demographic variables, such as gender, or transplant-related variables, such as time from transplantation, stress is a factor that might be changed through intervention (Table 5).²²

Table 4
Variables Studied in Electronic Monitoring Measures of Prednisolone Compliance in Kidney Transplant Recipients

Sociodemographic	Transplant Related	Psychosocial
<ul style="list-style-type: none"> Age Gender Marital status Employment status Social class Ethnicity Level of education 	<ul style="list-style-type: none"> Number of transplants Type of donor Time since transplantation Number of rejection episodes HLA match Duration of dialysis Donor diabetes or hypertension Duration of past transplants Disease severity Past medical details Functional health status* 	<ul style="list-style-type: none"> Illness beliefs† Medication beliefs‡ Psychological illness§ Social support¶ Expectation of transplant¶

HLA, human leukocyte antigen.
 *Using the Short Form-36 total scale scores.
 †Using the Illness Perception Questionnaire total scale scores and semi-structured interview.
 ‡Using the Beliefs About Medicines Questionnaire total scale scores and semi-structured interview.
 §Using the revised Clinical Interview Schedule total score and diagnosis of depression.
 ¶Using the Significant Others Scale total scale scores.
 ¶Using a 10-point Likert scale designed for this study.
 Adapted with permission from Butler JA et al. *Nephrol Dial Transplant*. 2004;19:3144-3149.¹²

Table 5**Variables Related to Compliance in Kidney Transplant Recipients²²**

Variable Type	Medication Compliance	Follow-up Compliance
Demographic	Male, married, older, and higher-income recipients more compliant than female, younger, unmarried, lower-income recipients ($P<.05$)	Married and higher-income recipients more compliant than unmarried, lower-income recipients ($P<.05$)
Transplant-related	First-time transplant recipients more compliant than repeat transplant recipients ($P<.05$)	Insulin-dependent patients prior to transplantation more compliant than non-insulin-dependent patients ($P<.05$); recipients with longer time from transplantation less compliant than those with shorter time from transplantation ($P<.05$)
Psychosocial	Greater emotional stress ($P<.01$), higher transplant-related stress ($P<.001$), belief that health outcomes were due to chance ($P<.05$), and use of avoidant coping strategies ($P<.05$) associated with more noncompliance	Greater emotional stress ($P<.01$), higher transplant-related stress ($P<.001$), and use of avoidant coping strategies ($P<.05$) associated with more noncompliance

A number of specific risk factors have been evaluated in individual studies in renal transplantation. Assessment of compliance by the demographic measure of ethnicity has not provided consistent results; however, a study designed to assess cognition, emotions, and behaviors in 519 renal transplant recipients concluded that compliance was an individual issue, not a cultural issue.²³ A retrospective analysis of 126 kidney transplant recipients suggested that pretransplant noncompliance and posttransplant noncompliance and graft loss ($P<.01$ for both) were significantly related. However, the retrospective nature of the study, which relied only on variables available in a chart audit, precluded inclusion of a number of important factors, such as patient beliefs, social support, and relationships with healthcare providers. Additionally, the data came from a single center with mostly deceased donor recipients.¹⁵

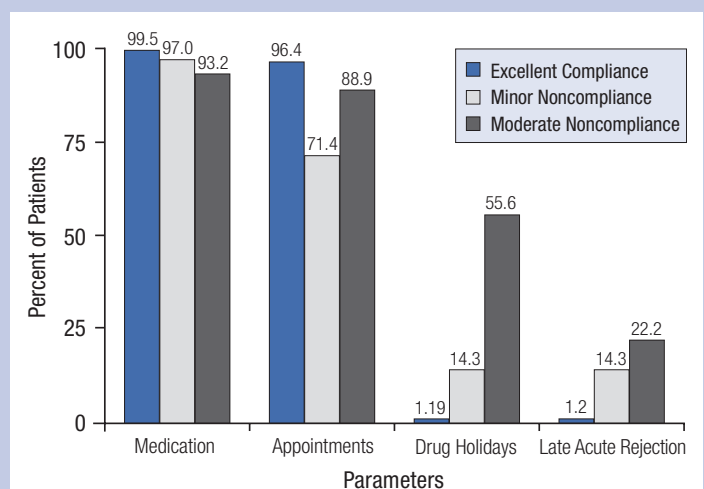
With approximately 1000 pediatric kidney transplantations done every year worldwide, compliance studies show that adolescents have noncompliance rates as high as 64%. A pilot study in 22 adolescents (13 to 18 years of age) used interviews (initial and follow-up after 12 months) to assess the relationship of psychological distress symptoms to compliance for medication, blood work, and clinic attendance. Whereas compliance with medication, blood work, and clinic visits did not change significantly between the interview times, those adolescents with excessive anger at the initial interview were more than 9 times more likely to be noncompliant

with medication than were those without anger. No significant difference was noted for adolescents with depressive symptoms or anxiety.²⁴ A more extensive questionnaire assessment of 56 renal transplant recipients (2.53 to 20.85 years of age) in the presence of their parents showed that noncompliant patients compared to compliant patients knew less about their disease, allograft, and immunosuppression, forgot to take medication or took more medication, and remembered fewer drug names.²⁵

Compliance studies in heart transplantation

In a series of publications following cardiac transplant recipients long-term, the longitudinal study of 101 European heart transplant recipients (primarily males, 87%) has provided extensive information on subclinical noncompliance in this study group. Compliance as measured by electronic monitoring of cyclosporine levels was high in this group, with median medication compliance of 99.4%; however, cluster analysis identified 3 groups with increasing extents of noncompliance that were associated with significantly increasing occurrences of late acute rejection ($P=.01$), appointment noncompliance ($P=.03$), and former medication noncompliance ($P=.02$) (Figure 3).¹¹ Of interest, interview ratings of

former noncompliance did not differ significantly between the groups nor did demographic characteristics, social support, symptom frequency or distress, depression, knowledge of immunosuppressive regimen, heart functional status, or perceived health status.¹¹ The importance of appointment noncompliance was reinforced in a later study of these patients by DeGeest and colleagues as

Figure 3**Compliance Parameters and Outcomes in Cardiac Transplant Recipients¹¹**

a crucial risk factor for late acute rejection, with compliers experiencing fewer acute late rejections than noncompliers ($P<.001$).²⁶ Further prospective 5-year follow-up of these patients reiterated that the potential for medication noncompliance needs constant surveillance and intervention, but there were no significant differences in compliance based on specific transplant-related or demographic variables. Those who were identified as noncompliers based on the electronic monitoring outcomes showed an increased number of late acute rejections and retransplantation, although differences did not reach statistical significance.²⁷ An interview-based study in the United States showed that whereas compliance significantly worsened over time ($P<.05$), in most areas evaluated, such as exercise, diet, blood work, and clinic attendance, background health-related and sociodemographic variables showed no significant impact on posttransplant compliance.²⁸

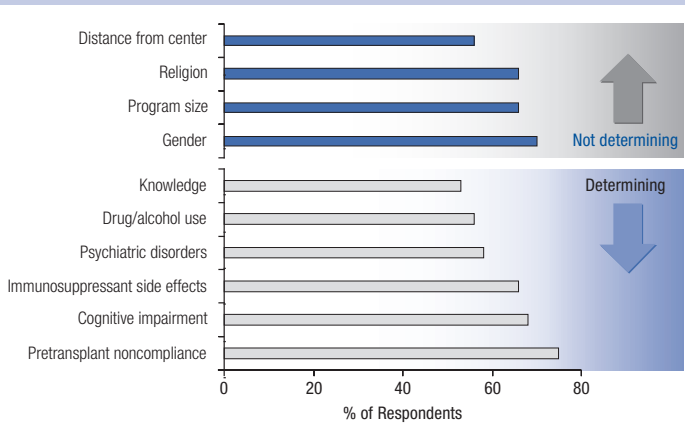
Clinicians' perception of compliance

A unique study surveyed clinicians (nurse/coordinators, physicians, surgeons) at North American and European transplant centers (N=70), including heart, liver, and kidney programs, for their individual perceptions of compliance. Awareness of noncompliance did negatively impact listing for transplantation as 58% of nurse/coordinators, 60% of physicians, and 80% of surgeons from the same programs indicated. The majority of clinicians (80%) responded that they were confident in discerning noncompliance related to medication or appointments but less confident in other areas, such as diet, exercise, or smoking. Also, 67% noted that childhood or adolescence was a major risk factor for noncompliance. Additional risk factors were perceived as either impacting or not affecting compliance by at least 50% of clinicians (Figure 4).²⁹

Strategies for Prevention or Prophylaxis of Noncompliance

A recent effort to develop a scale that would be practically useful in a clinical situation (eg, short questionnaire with less than 20 items completed in approximately 10 minutes) has provided patient designations of "controllable" and "uncontrollable" barriers to adherence (Table 6).¹³ Uncontrollable barriers for the patient include items that are not modifiable by the patient but may be within the control of the healthcare team, whereas controllable barriers are those for which intervention may assist the patient. Uncontrollable

Figure 4
Factors Perceived as Determining or Not Determining Noncompliance by 50% of Clinician Interview Respondents²⁹



barriers were associated with acute rejection ($P<.01$), but controllable barriers were not, perhaps because of dubious honesty of patient response.¹³

Overall, general groupings of factors that influence medication adherence are described as based on patient motivation and include access, knowledge, and skills.⁷ A drug study program in liver transplant

Table 6
Questionnaire Items Associated With Controllable and Uncontrollable Immunosuppressive Therapy Compliance

- | | |
|---|---------------------------|
| 1. I have to take the immunosuppressant medication(s) too many times per day. | Uncontrollable: Items 1-8 |
| 2. I have to take too many capsules (or tablets) of my immunosuppressant medication(s) at one time. | |
| 3. I cannot tell if my immunosuppressant medication(s) is (are) helping me. | |
| 4. I skip doses of my immunosuppressant medication(s) when I go out of town. | |
| 5. I miss doses of my immunosuppressant medication(s) when I feel depressed. | |
| 6. I get confused about how to take my immunosuppressant medication(s). | |
| 7. I do not understand when to take my immunosuppressant medication(s). | |
| 8. I often run out (or do not have enough) of my immunosuppressant medication(s). | |
| 9. It is hard for me to remember to take my immunosuppressant medication(s). | Controllable: Items 9-13 |
| 10. I miss a dose of my immunosuppressant medication(s) when I think there may be side effects. | |
| 11. I sometimes skip doses of my immunosuppressant medication(s) when I feel good (or better). | |
| 12. I miss doses of my immunosuppressant medication(s) when I get out of my daily routine. | |
| 13. I skip doses of my immunosuppressant medication(s) when I am short of money. | |

Adapted with permission from Chisholm MA et al. *Nephrol Dial Transplant*. 2005;20:181-188.¹³

recipients showed that noncompliance rates were significantly reduced ($P<.01$) when access to medications and financial support to receive them were addressed compared to noncompliance rates before program implementation,³⁰ but financial concerns are considered just one barrier to compliance.^{13,19}

Prophylaxis or interventions that are frequently explored to improve compliance include educational

and behavioral factors. Nursing interventions may be particularly critical in these areas because evidence is mounting that patient education through working with nurse specialists is more cost-effective than is conventional care.⁶ A recent comprehensive listing of medication compliance barriers and strategies to address them has been published to help clinicians with issues for the transplant recipient (Table 7).¹⁹

Table 7
Strategies Developed From Medication-Adherence Barriers

Barriers	Strategies
Medication Specifics	
Side effects of medication	<ul style="list-style-type: none"> • Select agents with as few side effects as possible to obtain therapeutic goals; explain side effects and what to do in case of occurrence
Belief that medication is not needed at prescribed dose	<ul style="list-style-type: none"> • Define optimal dose to the patient, then explain why the dose was selected for his/her therapy; reinforce optimal dose by explaining (verbally and in writing) how to take medication and optimal regimen
Belief that medication is not effective	<ul style="list-style-type: none"> • Explain importance of taking medication as prescribed and possible effect on disease state
Too many medication doses and medications to take per day	<ul style="list-style-type: none"> • Simplify regimen, use devices to remind patient to take medication, tailor medication therapy to patient's preferences (eg, liquids for children who cannot swallow pills, small pills/capsules)
No access to medication	<ul style="list-style-type: none"> • Prescribe cost-effectively; prescribe generics versus more expensive brand medications; assess patient's financial situation; assess patient's means of obtaining medication and transportation
Patient Knowledge/Comprehension	
Patient did not comprehend or understand how to take medication	<ul style="list-style-type: none"> • Explain (verbally and in writing) how to take medication and test patient's recall on how to take medication(s)
Patient is unable to comprehend how to take medication	<ul style="list-style-type: none"> • Have patient explain how he/she is (should be) taking medication to assess comprehension; communicate therapy to caregiver; provide written instructions
Patient does not understand his/her disease state and the importance of taking the medication	<ul style="list-style-type: none"> • Explain patient's disease or condition to her/him and how the medication is used to help treat the disease/condition
Patient Desire	
Patient does not have desire (or motivation) to take medication	<ul style="list-style-type: none"> • Stress the importance of taking medication as prescribed to help treat the patient's disease or condition; appeal to what is important (goals) to patient and how being healthy contributes to that goal
Treatment requires significant behavior changes for patient	<ul style="list-style-type: none"> • Make medication therapy convenient by simplifying regimens; use devices to remind patient to take medication; tailor medications to patient's preferences (eg, prescribe longer- vs short-acting drugs that require more dosages per day; prescribe combination products vs single-agent equivalents to reduce the number of medications/doses needed per day); link medication schedule to patient's regular daily activities
Healthcare Professional	
Physician did not explain how to take medication	<ul style="list-style-type: none"> • Explain (verbally and in writing) how to take medication
Patient lacks confidence in physician	<ul style="list-style-type: none"> • Communicate rationale for medication therapy to the patient, explain benefits of therapy and adhering to medical advice; discuss healthcare professional's expertise with treating patients
Physician does not include patient as part of the treatment-decision process	<ul style="list-style-type: none"> • Include patient in the decision-making process for designing therapy and assess his or her feelings toward therapy
Patient does not have trusting relationship with physician	<ul style="list-style-type: none"> • Develop a trusting relationship with the patient; respect the patient; exercise cultural sensitivity; optimize communication with patient by talking at an appropriate and understandable level without offending the patient; explain the disease state (condition) and treatment; solicit patient's feelings on the illness and treatment; solicit patient's input on treatment selection; demonstrate empathy; call patient to follow up with the illness/condition; encourage and give patient the opportunity (time) to ask questions
Lack of time to explain medication therapy and to assess patient medication adherence	<ul style="list-style-type: none"> • Take the time to explain (verbally and in writing) how to take medication; perform adherence interventions; provide therapy monitoring, education, and assessment outside of the office visit; enlist other healthcare professionals to help; have a medication review as part of the routine office visit; have patient present a list of medications he/she is taking and how he/she takes those medications at each visit
Patient Caregiver	
Caregiver does not understand how to administer medication	<ul style="list-style-type: none"> • Explain (verbally and in writing) how to give medication and test caregiver's recall of how to give medication(s)
Caregiver does not comprehend how to take medication	<ul style="list-style-type: none"> • Have caregiver explain how to take medication to assess comprehension; provide written instructions
Caregiver does not understand the patient's disease state and the importance of taking the medication	<ul style="list-style-type: none"> • Explain patient's condition/disease state and the importance of the medication in treating that condition/disease state
Patient does not have social support or caregiver	<ul style="list-style-type: none"> • Assess patient's environment and family situation; facilitate the finding of a caregiver; facilitate the employment of someone to help patient; enlist social worker help

Adapted with permission from Chisholm MA. *Manage Care Interface*. 2004;17;44-48.

There are much emphasis and support for the importance of quality communication between the transplant team and the patient to allow effective transmission of knowledge about the disease, medication, and the treatment regimen.¹⁹ Although caregivers, when available, are important,¹⁹ nursing interventions to foster patient self-care are receiving more attention.⁶ In particular, a number of nursing publications suggest that compliance is part of self-care behavior,¹ and, in a patient-centered approach, power and authority for decisions and behaviors should be transferred to the patient.⁵ Inclusion of the patient in decision making and adjusting regimens or medication when possible to include patient preferences is recommended.^{1,19} Simplification of treatment regimens with aids such as dosette boxes and timing of medications to better suit the patient's desires and lifestyles may contribute to compliance.^{1,3,19} Although clinicians should try to avoid drugs with side effects, discussions of the importance of particular medications with undesirable side effects, such as corticosteroids with acne and weight gain, or implementing other solutions to the side effects may benefit patient understanding and acceptance.³

CONCLUSIONS

Although many patients with solid organ transplants appear to be treatment compliant for a lifetime of graft

protection, noncompliance is considered a serious issue from not only a conceptual but also a practical point of view in the nursing community. The use of the term "compliance," its definition, and methodology of study remain controversial, but investigators forge ahead with efforts to clarify all aspects of this critical healthcare issue. Given this complexity, the numbers of patients who are diagnosed as noncompliant range widely, and the risk factors under study for potential or active noncompliance are extensive. Unfortunately, there is not yet an easy clinical, practical profile or diagnostic of a noncompliant or potentially noncompliant patient because of most risk factors have not proven consistently reliable among studies. As a result, one investigator offered the somewhat pessimistic approach of assuming that "every patient is a potential defaulter."^{5,31} Nurses play a critical role in all facets of prophylaxis and interventions for noncompliance, which have focused on education of the patient about immunosuppressive therapies, adjustments of treatment regimens and medications to better fit a patient's lifestyle and concerns, and better communication between the patient and the transplant team members. However, there is no controversy over the need to conduct more prospective research to attempt to reach a consensus on the major issues for all components of compliance.

REFERENCES

- Kyngas H, Duffy ME, Kroll T. Conceptual analysis of compliance. *J Clin Nurs*. 2000;9:5-12.
- Didlake RH, Dreyfus K, Kerman RH, Van Buren CT, Kahan BD. Patient noncompliance: a major cause of late graft failure in cyclosporine-treated renal transplants. *Transplant Proc*. 1988;20(3 suppl 3):63-69.
- Chapman JR. Compliance: the patient, the doctor, and the medication? *Transplantation*. 2004;77:782-786.
- Murphy N, Canales M. A critical analysis of compliance. *Nurs Inq*. 2001;8:173-181.
- Russell S, Daly J, Hughes E, Hoog Co C. Nurses and 'difficult' patients: negotiating non-compliance. *J Adv Nurs*. 2003;43:281-287.
- Wainwright SP, Gould D. Non-adherence with medications in organ transplant patients: a literature review. *J Adv Nurs*. 1997;26:968-977.
- Chisholm MA. Issues of adherence to immunosuppressant therapy after solid-organ transplantation. *Drugs*. 2002;62:567-575.
- Butler JA, Roderick P, Mullee M, Mason JC, Peveler RC. Frequency and impact of nonadherence to immunosuppressants after renal transplantation: a systematic review. *Transplantation*. 2004;77:769-776.
- De Geest S, Borgermans L, Gemoets H, et al. Incidence, determinants, and consequences of subclinical noncompliance with immunosuppressive therapy in renal transplant recipients. *Transplantation*. 1995;59:340-347.
- Garcia V, Bittar A, Keitel E, et al. Patient noncompliance as a major cause of kidney graft failure. *Transplant Proc*. 1997;29:252-254.
- De Geest S, Abraham I, Moons P, et al. Late acute rejection and subclinical noncompliance with cyclosporine therapy in heart transplant recipients. *J Heart Lung Transplant*. 1998;17:854-863.
- Butler JA, Peveler RC, Roderick P, Smith PW, Horne R, Mason JC. Modifiable risk factors for non-adherence to immunosuppressants in renal transplant recipients: a cross-sectional study. *Nephrol Dial Transplant*. 2004;19:3144-3149.
- Chisholm MA, Lance CE, Williamson GM, Mulloy LL. Development and validation of an immunosuppressant therapy adherence barrier instrument. *Nephrol Dial Transplant*. 2004;20:181-188.
- Kiley DJ, Lam CS, Pollak R. A study of treatment compliance following kidney transplantation. *Transplantation*. 1993;55:51-56.
- Douglas S, Blixen C, Bartucci MR. Relationship between pretransplant noncompliance and posttransplant outcomes in renal transplant recipients. *J Transpl Coord*. 1996;6:53-58.
- Jacox A, Suppe F, Campbell J, Stashinko E, eds. *Handbook of Clinical Nursing Research*. Thousand Oaks: Sage Publications; 1999.
- Siegal B, Greenstein S. Compliance and noncompliance in kidney transplant patients: cues for transplant coordinators. *J Transpl Coord*. 1999;9:104-108.
- Butler JA, Peveler RC, Roderick P, Horne R, Mason JC. Measuring compliance with drug regimens after renal transplantation: comparison of self-report and clinician rating with electronic monitoring. *Transplantation*. 2004;77:786-789.
- Chisholm MA. Identification of medication-adherence barriers and strategies to increase adherence in recipients of renal transplants. *Manag Care Interface*. 2004;17:44-48.
- Greenstein S, Siegal B. Odds probabilities of compliance and noncompliance in patients with a functioning renal transplant: a multicenter study. *Transplant Proc*. 1999;31:280-281.
- Siegal B, Halbert RJ, McGuire MJ. Life satisfaction among kidney transplant recipients: demographic and biological factors. *Prog Transplant*. 2002;12:293-298.
- Frazier PA, Davis-Ali SH, Dahl KE. Correlates of noncompliance among renal transplant recipients. *Clin Transplant*. 1994;8:550-557.
- Siegal BR, Greenstein SM. Postrenal transplant compliance from the perspective of African-Americans, Hispanic-Americans, and Anglo-Americans. *Adv Ren Replace Ther*. 1997;4:46-54.
- Penkower L, Dew MA, Ellis D, Sereika SM, Kitutu JM, Shapiro R. Psychological distress and adherence to the medical regimen among adolescent renal transplant recipients. *Am J Transplant*. 2003;3:1418-1425.
- Meyers KE, Thomson PD, Weiland H. Noncompliance in children and adolescents after renal transplantation. *Transplantation*. 1996;62:186-189.
- De Geest S, Dobbels F, Martin S, Willems K, Vanhaecke J. Clinical risk associated with appointment noncompliance in heart transplant recipients. *Prog Transplant*. 2000;10:162-168.
- Dobbels F, De Geest S, van Cleemput J, Drooghe W, Vanhaecke J. Effect of late medication non-compliance on outcome after heart transplantation: a 5-year follow-up. *J Heart Lung Transplant*. 2004;23:1245-1251.
- Dew MA, Roth LH, Thompson ME, Kormos RL, Griffith BP. Medical compliance and its predictors in the first year after heart transplantation. *J Heart Lung Transplant*. 1996;15:631-645.
- Hathaway DK, Combs C, De Geest S, Stergachis A, Moore LW. Patient compliance in transplantation: a report on the perceptions of transplant clinicians. *Transplant Proc*. 1999;31:10S-13S.
- Paris W, Dunham S, Sebastian A, Jacobs C, Nour B. Medication nonadherence and its relation to financial restriction. *J Transpl Coord*. 1999;9:149-152.
- Cameron C. Patient compliance: recognition of factors involved and suggestions for promoting compliance with therapeutic regimens. *J Adv Nurs*. 1996;24:244-250.

STATE-OF-THE-ART MANAGEMENT OF POSTTRANSPLANT SEQUELAE THERAPEUTIC COMPLIANCE POSTTRANSPLANTATION—A NURSE'S PERSPECTIVE

CME/CE POSTTEST AND EVALUATION

Release Date: August 2005 Expiration Date: August 31, 2006

If you wish to receive CME/CE credit and a statement of completion, please mail or fax a copy of your completed answer sheet/registration/evaluation on page 14 to:

For physicians and nurses: University of Minnesota
Office of CME
190 McNamara Alumni Center
200 Oak Street SE
Minneapolis, MN 55455
Attn: Distance Learning (DL-05-105D)
Fax: 612-626-7766

For pharmacists: Continuing Pharmacy Education
University of Minnesota
College of Pharmacy
420 Delaware Street SE, MMC 387
Minneapolis, MN 55455
Fax: 612-626-4613

POSTTEST

Jeff L. is a 19-year-old student who underwent kidney transplantation at 16 years of age because of kidney failure. His 24-year-old cousin donated the well-matched kidney. Jeff is on a maintenance immunosuppressive regimen of tacrolimus, corticosteroids, and mycophenolate mofetil. He had experienced minor episodes of weight gain and loss, which were associated with diet and exercise levels, as well as periodic acne vulgaris. After being very cooperative and having an uneventful clinical course while living at home, Jeff missed two scheduled appointments after beginning his freshman year and living in a dormitory at a local college. In part because of his evasiveness and sullenness during a subsequent appointment, both his nurse and doctor suspect that he is not correctly taking his immunosuppressive medication as scheduled.

1. The certainty of a diagnosis of noncompliance for Jeff would most importantly come from
 - a. Assessment of tacrolimus blood levels
 - b. Lack of Cushingoid appearance
 - c. Patient admission
 - d. Parental questioning

Because of Jeff's immaturity at the time of transplantation, his parents had assumed responsibility to ensure that he adhered to the recommended immunosuppressive regimen while he was living at home. Jeff reluctantly admitted that his parents had strongly emphasized the importance of his medication and arranged his activities to support his health needs, but he had wanted to be independent in college and make his own decisions. During the appointment, Jeff seemed indifferent to discussing his medications or health, but he showed interest in avoiding weight gain and any recurrence of acne.

2. The preferred approaches to try to improve his compliance would be: (Select one answer)
 - a. Discuss the adverse side effects associated with corticosteroid immunosuppression with Jeff and his parents and start immediate corticosteroid weaning

4. The definition of compliance as "the extent to which a person's behavior (taking medications, following a recommended diet or executing life-style changes) coincides with medical or health advice" has been firmly accepted by the following groups:

- a. Nurses, physicians, and pharmacists
- b. Nurses, physicians, and surgeons
- c. Physicians, pharmacists, and surgeons
- d. None of the above

5. In a study by Didlake, noncompliance was reported as being the _____ leading cause of graft loss in renal transplant recipients.

- a. First
- b. Second
- c. Third
- d. Fourth

6. A meta-analysis based upon a systematic review of the literature in renal transplantation revealed that noncompliance is common and contributes significantly to graft loss with the odds of graft failure in noncompliant compared to compliant patients found to be increased by:

- a. 12-fold
- b. 7-fold
- c. 5-fold
- d. 2-fold

- b. Initiate electronic pill monitoring for the corticosteroids and mycophenolate mofetil, schedule more frequent therapeutic monitoring of tacrolimus levels, and begin a regular review of his medications with Jeff in the presence of his parents
- c. Clarify how much Jeff knows about his immunosuppressive medications, provide educational materials and tools to help Jeff better understand his situation, and discuss with Jeff ways to optimize his medication schedule to fit his college lifestyle
- d. Discuss with Jeff the importance of taking the immunosuppressive drugs as originally scheduled but increase the tacrolimus dose to offset any future noncompliance; request that Jeff provide a blood sample every week to monitor his creatinine levels

After maintaining good graft function for 4 years and graduating from college, Jeff has rescheduled and delayed multiple appointments over the last 6 months and now shows signs of significant weight loss. The company where he was employed recently downsized, and Jeff was one of the employees laid off. Because of the resulting financial difficulties, he was forced to move back in with his parents and has confessed to feeling depressed over his bad luck. His renal function has deteriorated, with marked increases in serum creatinine levels, decreased glomerular filtration rates, and increased proteinuria. His renal biopsy revealed signs of severe allograft nephropathy, and his kidney is expected to fail shortly.

3. Your assessment is: (Select one answer)
 - a. Jeff has tried to lose weight by eliminating his corticosteroid immunosuppression
 - b. Jeff should be excluded from the opportunity to receive a second transplant because of suspected noncompliance
 - c. Jeff's recent unemployment has left him depressed and unable to comply with taking his medication properly
 - d. None of the above

7. Noncompliant renal transplant recipients were assessed by cluster analyses then profiled by Siegel and colleagues based on patient beliefs as belonging to one of three groups:

- a. Accidental, invulnerable, or decisive
- b. Accidental, imperative, or deliberate
- c. Accountable, vulnerable, or decisive
- d. Accountable, reliable, or deliberate

8. Adolescents have a reported rate of noncompliance as high as:

- a. 12%
- b. 39%
- c. 58%
- d. 64%

9. In a study of heart transplant recipients by DeGeest and colleagues, the factor found significantly related to incidence of late acute rejection was:

- a. Diet noncompliance
- b. Appointment noncompliance
- c. Age
- d. Gender

10. Clinicians responding to a survey on compliance in solid organ transplantation perceived the following to be determinants of noncompliance:

- a. Gender, cognitive impairment, transplant program size
- b. Distance from transplant center, drug/alcohol use, religion
- c. Pretransplant noncompliance, drug/alcohol use, immunosuppressive drug side effect
- d. Psychiatric disorders, distance from transplant center, gender

STATE-OF-THE-ART MANAGEMENT OF POSTTRANSPLANT SEQUELAE THERAPEUTIC COMPLIANCE POSTTRANSPLANTATION—A NURSE'S PERSPECTIVE

CME/CE POSTTEST AND EVALUATION (DL-05-105D)

Release Date: August 2005 Expiration Date: August 31, 2006

POSTTEST ANSWER KEY (questions from page 9)

- | | | | | |
|------------------|------------------|-------------------|------------------|-------------------|
| 1. a b c d | 3. a b c d | 5. a b c d. | 7. a b c d | 9. a b c d |
| 2. a b c d | 4. a b c d | 6. a b c d | 8. a b c d | 10. a b c d |

PROGRAM EVALUATION

The University of Minnesota would appreciate your comments regarding the quality of the information presented.

1. Each of the following program educational objectives were fully met:

- Discuss the current definitions of and alternative terminology for compliance
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
- Understand the wide range of studies devoted to characterizing compliant and noncompliant transplant recipients
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
- Evaluate the short- and long-term impact of noncompliance on the transplanted organ and transplant recipient
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
- Describe approaches to determine compliance
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
- Evaluate strategies and interventions to address compliance issues
☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

2. The quality of the educational process (method of presentation and information provided) was satisfactory and appropriate.

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

3. The educational activity has enhanced my professional effectiveness and improved my ability to treat/manage patients.

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree ☐ N/A

4. The educational activity has improved my ability to communicate with patients.

☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree ☐ N/A

5. The information presented was free of promotional or commercial bias.

☐ Agree ☐ Disagree

6. What changes will you make in your practice as a result of participating in this program?

7. Comments/suggestions regarding *this* material: _____

8. Recommendations for *future* presentations: _____

9. What is the most important barrier to the optimal posttransplant management of patients receiving renal transplants? (Select one answer.)

- | | |
|---|-------------------------------------|
| <input type="checkbox"/> Patient adherence | <input type="checkbox"/> Infections |
| <input type="checkbox"/> Side effects of immunosuppressive agents | <input type="checkbox"/> Neoplasia |
| <input type="checkbox"/> Renal function | <input type="checkbox"/> Other |

10. Approximately how many patients do you see per week? _____

11. Approximately what percentage of your patients are renal transplant recipients?

Degree: ☐ MD ☐ RN ☐ Other _____
 ☐ DO ☐ PharmD

Job Title	Practice Type
<input type="checkbox"/> Transplant Surgeon	<input type="checkbox"/> Private
<input type="checkbox"/> Nephrologist	<input type="checkbox"/> Group
<input type="checkbox"/> Transplant Coordinator	<input type="checkbox"/> Transplant Center
<input type="checkbox"/> Transplant Pharmacist	<input type="checkbox"/> Academic
<input type="checkbox"/> Transplant Case Manager	Practice Location
<input type="checkbox"/> Nurse	<input type="checkbox"/> Urban
<input type="checkbox"/> Other _____	<input type="checkbox"/> Suburban
	<input type="checkbox"/> Rural

I certify that I completed this CME/CE activity. The actual amount of time I spent in this activity was: _____ hours _____ minutes.

Signature _____

Date Completed _____

PHYSICIANS: Are you licensed in the United States?

☐ YES ☐ NO

NURSES: State of license and number _____

The information presented in this material is intended solely for the continuing medical education needs of healthcare professionals. Healthcare professionals and individuals should not rely upon any of the information provided in this material. Some presented product information may be for unlabeled/investigational uses. Before using or prescribing any product discussed in this publication, clinicians should consult the full prescribing information.

The views presented herein are those of the faculty and not necessarily those of SynerMed® Communications, the commercial supporter, or CME sponsor.

SynerMed® Communications owns all copyrights to this material, and no person shall have the right to use, duplicate, distribute, modify, or create derivative versions of this material, in any manner or in any medium, except as necessary to complete the program for obtaining continuing medical education credit. Any violation of this shall result in appropriate legal action being taken.

**All correspondence concerning the contents of
this publication should be directed to:**

SynerMed® Communications

Dept WA48G

405 Trimmer Road

PO Box 458

Califon, NJ 07830



Developed and Produced by

